CERTIK

Preliminary Comments

ZUKI MOBA

Nov 15th, 2021

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Summary

This report has been prepared for ZUKI MOBA to discover issues and vulnerabilities in the source code of the ZUKI MOBA project as well as any contract dependencies that were not part of an officially recognized library. A comprehensive examination has been performed, utilizing Static Analysis and Manual Review techniques.

The auditing process pays special attention to the following considerations:

- Testing the smart contracts against both common and uncommon attack vectors.
- Assessing the codebase to ensure compliance with current best practices and industry standards.
- Ensuring contract logic meets the specifications and intentions of the client.
- Cross referencing contract structure and implementation against similar smart contracts produced by industry leaders.
- Thorough line-by-line manual review of the entire codebase by industry experts.

The security assessment resulted in findings that ranged from critical to informational. We recommend addressing these findings to ensure a high level of security standards and industry practices. We suggest recommendations that could better serve the project from the security perspective:

- Enhance general coding practices for better structures of source codes;
- Add enough unit tests to cover the possible use cases;
- Provide more comments per each function for readability, especially contracts that are verified in public;
- Provide more transparency on privileged activities once the protocol is live.

Overview

Project Summary

Project Name	ZUKI MOBA
Platform	ethereum
Language	Solidity
Codebase	https://bscscan.com/address/0xe81257d932280ae440b17afc5f07c8a110d21432
Commit	

Audit Summary

Delivery Date	Nov 15, 2021
Audit Methodology	Static Analysis, Manual Review
Key Components	

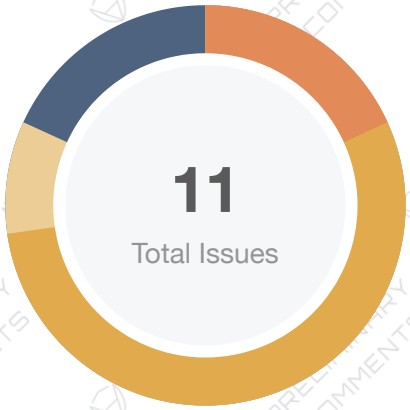
Vulnerability Summary

Vulnerability Level	Total	Pending	Declined	Acknowledged	Partially Resolved	Resolved
Critical	0	0	0	0	0	0
Major	2	2	0	0	0	0
Medium	6	6	0	0	0	0
Minor	1	1	0	0	0	0
Informational	2	2	0	0	0	0
Discussion	0	0	0	0	0	0

Audit Scope

ID	File	SHA256 Checksum
ZUK	ZUKI MOBA.sol	53ac7d989495a666a885f9652e3c70bec8e1605fa1cc9cf7ce40d78cd44d24d0

Findings



Critical	**0** (0.00%)
Major	**2** (18.18%)
Medium	**6** (54.55%)
Minor	**1** (9.09%)
Informational	**2** (18.18%)
Discussion	**0** (0.00%)

ID	Title	Category	Severity	Status
GLOBAL-01	Third Party Dependencies	Volatile Code	Minor	Pending
ZUK-01	Missing Emit Events	Coding Style	Informational	Pending
ZUK-02	Centralization Risk	**Centralization / Privilege**	**Major**	Pending
ZUK-03	Initial token distribution	**Centralization / Privilege**	**Medium**	Pending
ZUK-04	Variable could be declared as `constant`	Gas Optimization	Medium	Pending
ZUK-05	Missing Input Validation	Volatile Code	Medium	Pending
ZUK-06	Redundant Statements	Volatile Code	Medium	Pending
ZUK-07	Inaccurate Error Message	Coding Style	Informational	Pending
ZUK-08	Incorrect Event Emission	Logical Issue	Medium	Pending
ZUK-09	Redundant Function	Volatile Code	Medium	Pending
ZUK-10	Incorrect Invert Check	Logical Issue	Major	Pending

GLOBAL-01 | Third Party Dependencies

Category	Severity	Location	Status
Volatile Code	Minor	Global	Pending

Description

The contract is serving as the underlying entity to interact with third-party Pancake protocols. The scope of the audit treats 3rd party entities as black boxes and assumes their functional correctness. However, in the real world, 3rd parties can be compromised and this may lead to lost or stolen assets. In addition, upgrades of 3rd parties can possibly create severe impacts, such as increasing fees of 3rd parties, migrating to new LP pools, etc.

Recommendation

We understand that the business logic of `ZUKI MOBA` requires interaction with Pancake, etc. We encourage the team to constantly monitor the statuses of 3rd parties to mitigate the side effects when unexpected activities are observed.

ZUK-01 | Missing Emit Events

Category	Severity	Location	Status
Coding Style	Informational	projects/ZUKI%20MOBA/contracts/ZUKI MOBA.sol (3386362): 526, 557	Pending

Description

The functions that affect the status of sensitive variables should be able to emit events as notifications to users.

- `transferToken()`
- `changeFee()`

Recommendation

Consider adding events for sensitive actions, and emit them in the function.

ZUK-02 | Centralization Risk

Category	Severity	Location	Status
Centralization / Privilege	Major	projects/ZUKI%20MOBA/contracts/ZUKI MOBA.sol (3386362): 96~97, 459, 465, 470~474, 486~490, 502~506, 706, 715, 726, 526~531, 537~541, 553, 557, 561~565	Pending

Description

In the contract, the role `Owner` (the contact deployer) has the authority over the following function:

- 'mint()', which allows the 'owner' to mint any amount of token to himself.
- '_initialize()', which sets 'feeWallet' to 'owner'.
- 'enableMint()',which allows the 'owner' to modify the 'mintable' status.
- 'modifyWhiteListSender()', which the 'owner' can modify the while list of senders.
- 'modifyWhiteListReceiver()', which the 'owner' can modify the while list of receivers.
- 'modifyBlackList()', the 'owner' can modify the black list.
- 'renounceOwnership()', the 'owner' can renounces ownership.
- 'transferOwnership()', the 'owner' can transfers ownership.
- 'lock()', the 'owner' locks the contract for the owner for the amount of time provided.
- 'transferToken()', the 'owner' transfers funds out of current contracts.
- 'modifyWhiteListBot()', the 'owner' changes white list of bot.
- 'changeFeeWallet()', the 'owner' changes the fee wallet.
- 'changeFee()', the 'owner' changes the fee.
- 'modifyWhiteListPool()', the 'owner' changes the white list pool.

Any compromise to the `owner` account may allow the hacker to take advantage of these.

Recommendation

We advise the client to carefully manage the `owner` account's private key to avoid any potential risks of being hacked. In general, we strongly recommend centralized privileges or roles in the protocol to be improved via a decentralized mechanism or smart-contract-based accounts with enhanced security practices, e.g., Multisignature wallets.

Indicatively, here is some feasible suggestions that would also mitigate the potential risk at the different level in term of short-term and long-term:

- Time-lock with reasonable latency, e.g., 48 hours, for awareness on privileged operations;

- Assignment of privileged roles to multi-signature wallets to prevent a single point of failure due to the private key;
- Introduction of a DAO/governance/voting module to increase transparency and user involvement.

ZUK-03 | Initial token distribution

Category	Severity	Location	Status
Centralization / Privilege	Medium	projects/ZUKI%20MOBA/contracts/ZUKI MOBA.sol (3386362): 97~98	Pending

Description

`1000 * 10**6 * 10**18` of tokens are sent to the contract deployer when deploying the contract. This could be a centralization risk as the deployer can distribute tokens without obtaining the consensus of the community. Since the privilege of the deployer, it is possible of being maliciously manipulated by hackers if the account of the deployer was compromised.

Recommendation

We recommend the team to be transparent regarding the initial token distribution process, and the team shall make enough efforts to restrict the access of the private key.

ZUK-04 | Variable could be declared as `constant`

Category	Severity	Location	Status
Gas Optimization	Medium	projects/ZUKI%20MOBA/contracts/ZUKI MOBA.sol (3386362): 1307~1308	Pending

Description

The linked variables could be declared as `constant` since these state variables are never modified.

Recommendation

It is recommended to declare variable 'maxSupply' as constant.

ZUK-05 | Missing Input Validation

Category	Severity	Location	Status
Volatile Code	Medium	projects/ZUKI%20MOBA/contracts/ZUKI MOBA.sol (3386362): 175, 244	Pending

Description

In the aforementioned line, the given address 'recipient' in the 'whiteListReceiver' function is missing the check for the non-zero address.

Recommendation

We advise adding the check for the passed-in values to prevent unexpected errors. The **require** can be used to check for conditions and throw an exception if the condition is not met.

ZUK-06 | Redundant Statements

Category	Severity	Location	Status
Volatile Code	Medium	projects/ZUKI%20MOBA/contracts/ZUKI MOBA.sol (3386362): 444, 341, 363, 384	Pending

Description

The linked statements do not affect the functionality of the codebase.

Recommendation

We advise that they be removed to better prepare the code for production environments. and advise removing every '_beforeTokenTransfer' function call.

- function call :line 341
- function call :line 361
- function call : line 384

ZUK-07 | Inaccurate Error Message

Category	Severity	Location	Status
Coding Style	Informational	projects/ZUKI%20MOBA/contracts/ZUKI MOBA.sol (3386362): 736~737	Pending

Description

The error message in `require(block.timestamp > _lockTime , "Contract is locked until 7 days");` does not describe the error correctly since the 'lockTime' is variable.

ZUK-08 | Incorrect Event Emission

Category	Severity	Location	Status
Logical Issue	Medium	projects/ZUKI%20MOBA/contracts/ZUKI MOBA.sol (3386362): 730	Pending

Description

The event `OwnershipTransferred` has two parameters that demonstrate the ownership transfer between the `previousOwner` address and `newOwner` address. In the function `Lock()`, the `_owner` is changed to `address(0)` at Line 728, so the emitted `_owner` is the same as `address(0)` in the event which may contradict the purpose of this event.

Recommendation

We recommend the client to change

```
'emit OwnershipTransferred(_owner, address(0))'
```

to

```
'emit OwnershipTransferred(_previousOwner, address(0))'
```

.

ZUK-09 | Redundant Function

Category	Severity	Location	Status
Volatile Code	Medium	projects/ZUKI%20MOBA/contracts/ZUKI MOBA.sol (3386362): 426	Pending

Description

The function `_setupDecimals` is redundant, seems the method is defined to set up '_decimals' in constructor.

Recommendation

We advise the team to remove the function `_setupDecimals` since the '_decimals' was inited in function '_initialize'.

ZUK-10 | Incorrect Invert Check

Category	Severity	Location	Status
Logical Issue	Major	projects/ZUKI%20MOBA/contracts/ZUKI MOBA.sol (3386362): 1336~1337	Pending

Description

The logic of the code line 'if(swapWhiteList && whiteListPool[recipient] && !whiteListBot[sender])' is incorrect.

Since the naming convention is not unified, we are uncertain what the contract originally intend to check:

```
'if(swapWhiteList && !whiteListPool[recipient]) && !whiteListPool[sender]'
```

OR

```
'if(swapWhiteList && whiteListPool[recipient]) && whiteListPool[sender]'
```

In addition, the error message is wrong as well.

```
revert("Anti Bot");
```

Recommendation

we recommend revisiting the logic of this function.

Appendix

Finding Categories

Centralization / Privilege

Centralization / Privilege findings refer to either feature logic or implementation of components that act against the nature of decentralization, such as explicit ownership or specialized access roles in combination with a mechanism to relocate funds.

Gas Optimization

Gas Optimization findings do not affect the functionality of the code but generate different, more optimal EVM opcodes resulting in a reduction on the total gas cost of a transaction.

Logical Issue

Logical Issue findings detail a fault in the logic of the linked code, such as an incorrect notion on how block.timestamp works.

Volatile Code

Volatile Code findings refer to segments of code that behave unexpectedly on certain edge cases that may result in a vulnerability.

Coding Style

Coding Style findings usually do not affect the generated byte-code but rather comment on how to make the codebase more legible and, as a result, easily maintainable.

Checksum Calculation Method

The "Checksum" field in the "Audit Scope" section is calculated as the SHA-256 (Secure Hash Algorithm 2 with digest size of 256 bits) digest of the content of each file hosted in the listed source repository under the specified commit.

The result is hexadecimal encoded and is the same as the output of the Linux "sha256sum" command against the target file.

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